We claim:

1. A method for encoding auxiliary data into a host signal comprising:

computing a content specific message dependent on the host signal;

encoding the content specific message into a watermark signal;

embedding the watermark in the host signal such that the watermark signal is substantially imperceptible in the host signal.

2. The method of claim 1 wherein the content specific message represents one or more salient features of the host signal.

3. The method of claim 2 wherein the host signal comprises an image signal, and the salient features include spatial locations of the salient features.

4. The method of claim 3 wherein the image signal comprises a photo of a person, and the salient features include one or more of the following facial features of the person in the photo: eyes, nose, and mouth; wherein the photo is authenticated by decoding the spatial locations of the salient features from the watermark and comparing the decoded features with features in the photo.

5. The method of claim 1 wherein the content specific message comprises a semi-sensitive hash of the host signal, where the semi-sensitive hash is defined as a hash that remains substantially unchanged through digital to analog and analog to digital conversion of the host signal.

6. The method of claim 5 wherein the semi-sensitive hash comprises a low pass filtering of the host signal.

7. The method of claim 6 wherein the low pass filtering comprises selecting most significant bits of selected parts of the host signal.

8. The method of claim 5 wherein the host signal comprises a photo of a bearer of a photo identification document that is printed on the document.

5   9. The method of claim 8 further including:

encoding a unique identifier of the bearer in the watermark signal such that the photo identification document is authenticated by scanning the photo, decoding the unique identifier from the scanned photo, and comparing the unique identifier with an expected unique identifier for the bearer.

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10. The method of claim 9 wherein the expected unique identifier is read from a different part of the photo identification document other than the photo.

11. The method of claim 1 wherein the host signal is an image on an object, and
15   the content specific message comprises a unique identifier associated with a bearer of the object.

12. A computer readable medium on which is stored software for performing the method of claim 1.

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13. A method for authenticating a media object comprising:

transforming a media signal to a frequency domain comprising an array of frequency coefficients;

selecting a first set of frequency coefficients;

25   altering the selected first set of frequency coefficients so that values of the coefficients in the set correspond to a pattern; wherein the pattern of the media signal is authenticated by comparing a pattern of the values of the frequency coefficients in the set with an expected pattern.

14. The method of claim 13 wherein the coefficients comprise subband coefficients in a wavelet decomposition of the media signal.

15. The method of claim 13 including:

5   encoding message symbols into the media signal, where the message symbols each have corresponding coefficient values, the encoding including reading a first coefficient in the first set, selecting a coefficient value among the coefficient values corresponding to a symbol to be encoded that results in a minimum change to the first coefficient, replacing the first coefficient in the first set with the selected coefficient

10   value, and repeating the process of reading, selecting, and replacing coefficients to encode one or more additional message symbols in the first set of coefficients.

16. The method of claim 13 further including:

for each coefficient in the first set, selecting a corresponding coefficient in a

15   corresponding set, and changing values of the coefficients in the first set and the corresponding coefficients in the corresponding set such that the differences between the coefficient values in the first set and the corresponding set form a desired delta pattern.

17. The method of claim 16 wherein the desired delta pattern is a pseudorandom

20   pattern.

18. The method of claim 17 wherein the pseudorandom pattern is generated from a seed number derived from the media signal.

25   19. The method of claim 16 wherein changing values of the coefficients in the first set and the corresponding set includes replacing a coefficient in the first set with a value computed as an average of the coefficient in the first set and the corresponding coefficient in the second set plus a delta value, and replacing the corresponding coefficient in the corresponding set with the average minus the delta value.

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20. A computer readable medium on which is stored software for performing the method of claim 13.

21. An object bearing a media signal that has processed according to the method of claim 13.

22. An object bearing a host signal that has been encoded with auxiliary data according to the method of claim 1.

23. An identification document including:

a first image embedded with watermark data and printed on the document;

wherein a copy of the first image is embedded with watermark data, and is referenced on the document or encoded into the document; and

wherein the watermark data embedded in the first image and the copy is related in a manner that enables validity of the document to be verified.

24. The identification document of claim 23 wherein the copy of the first image is stored in a machine readable code on the document.

25. The identification document of claim 24 wherein the copy of the first image is compressed before being stored in the machine readable code.

26. The identification document of claim 23 wherein the copy of the first image is stored in a database entry referenced via a database key in the watermark data embedded in the first image printed on the document; and wherein the database key extracted from the watermark in the first image is used to look up the copy of the first image in the database entry.

25. The identification document of claim 21 wherein the watermark data embedded in the first image printed on the document includes a number that is cryptographically related to a number embedded in the copy of the first image.

26. A method for encoding auxiliary data into a host signal comprising:

computing a content specific message dependent on the host signal;

encoding the content specific message into a watermark signal;

embedding the watermark in the host signal such that the watermark signal is substantially imperceptible in the host signal;

wherein the content specific message includes data representing locations of one or more salient features of the host signal.

27. The method of claim 26 wherein the host signal comprises a photo of a person, and the one or more salient features include one or more of the following facial features of the person in the photo: eyes, nose, and mouth; wherein the photo is authenticated by decoding the spatial locations of the salient features from the watermark and comparing the decoded features with features in the photo.

28. A decoder for decoding the locations of the salient features from the host signal that have been embedded into the host signal according to the method of claim 26, and for comparing the decoded locations with locations of features in the host signal to determine authenticity of the host signal.

29. An object carrying an image that has been processed according to the method of claim 26.

30. A method for authenticating a media object comprising:

transforming a media signal to a frequency domain comprising an array of frequency coefficients;

selecting a first set of frequency coefficients;

altering the selected first set of frequency coefficients so that values of the coefficients in the set correspond to a pattern; wherein the pattern of the media signal is authenticated by comparing a pattern of the values of the frequency coefficients in the set with an expected pattern;

for each coefficient in the first set, selecting a corresponding coefficient in a corresponding set, and changing values of the coefficients in the first set and the corresponding coefficients in the corresponding set such that the differences between the coefficient values in the first set and the corresponding set form a desired delta pattern.

31. A decoder for decoding the pattern from a media signal that has been processed according to claim 30.

32. An object carrying an image that has been processed according to the method of claim 30.